

Meaningful Maths:

Teaching map skills

new VOICES



Miranda Pacaya

Whittle

presents ideas

for engaging

upper primary

students in

meaningful

mathematics

learning with

maps.

In my experience, lessons that are clearly meaningful for students beyond the classroom can foster positive attitudes, increase enjoyment and enhance the learning. In this paper I offer suggestions on how to plan for meaningful mathematics lessons using the topic of map skills as an example. As well, I present some specific ideas for meaningful map lessons using the local page from a street directory.

The positive effects of a meaningful lesson

During my last practicum I did a couple of map lessons with a Year 6 class. The first lesson came out of their textbooks and it involved using map scale to calculate distances between locations in an imaginary town. The students completed their work without many comments and, as far as I could see, without much interest. However, for the second lesson, using an idea from the *NSW Mathematics K-6 Syllabus* (Board of Studies NSW, 2002, p. 155), I had them calculate distance using the local page from a street directory (see Figure 1). The moment I handed-out the copies of the map, the students instantly started scanning for their homes.

“Hey, my house is right here!”

“Where do you live?” “Look! There’s the park. Sean and Jed live right there, just up the street a little,”

I heard them say in turn, as they nudged each other – and this buzz of excitement lasted throughout the lesson. I realised the students were engaged because this lesson, unlike the previous one, was about where they lived, for real, the streets they rode, the parks they played soccer in and the school they were sitting in right now. It meant something to them personally and it was realistic as well. In both these ways then, the realm of classroom mathematics was meeting the realm of real-life, the one outside of school, and that had an enlivening effect, for both the mathematics and the students.

Planning meaningful lessons: Teacher-student discourse and an investigation into everyday uses

My experience with these lessons on map skills made me think how important it is to relate mathematics activities to students’ lives if they are to be motivated and engaged. In fact, the research shows

Name _____ Date _____

Riding home

How long will it take you?

- Find our school
What are the coordinates? _____
- Calculate the map scale. (See the top of the map)

Map Scale


5cm = _____ km (_____ m)

1cm = _____ m
- Find your home on the map.
 - What are the coordinates? _____
 - Following the streets, choose a route from school to your home (or other chosen destination)
What is the distance? _____

Show your math or
How did you do that?
 - If your average bike riding speed is 20km/hr how long will it take you to ride from school to your home (or other destination)?
Time _____

Show your math or
How did you do that?

If your home is not on the map, find someone else's home or choose another destination of interest.



2007 Sydway Greater Sydney & Blue Mountains Street Directory, Page 189

Sydway Publishing Pty Ltd. Coogee NSW

that middle years students, Years 5 to 8, in particular, who have been found to suffer from failing attitude and enjoyment of learning (Snapshots of the middle years, 1997, cited in Vale, 1999, p. 1) as well as stagnation of achievement (Hill, 1994, cited in Vale, 1999, p. 1), need mathematics to “provide meaning on a personal level as well as in a numeracy sense, that is an understanding of mathematics that enables them to use their knowledge and skills in a way that...[is] relevant to their daily lives” (Vale, 1999, p. 5).

There are some things that can assist teachers planning for meaningful lessons. For one thing, teachers can get to know their students. In the long run, this comes with time and shared experience. However, when the teacher wants to find out what the students know, what their points of reference are and what interests them about a specific mathematics topic, focused teacher-student discourse can offer useful insight for the teacher for planning lessons (Brenner, 1998, p. 151). For example, if ‘map skills’ is the topic, there could be a discussion in which the teacher asks the students such questions as the following:

- What do you know about maps?
- Have you ever used a map outside of school? If so, what kind of map was it and how did you use it?
- Do your parents use maps? What kinds of maps do they use and what information do they get from the maps?

- If you had a map of our local area right now, what would you look for? What could you figure out using the map that would be useful or interesting to you personally?

Questions about how the students travel could also be useful in designing map tasks, such as:

- How do you usually travel to and from school?
Around your neighbourhood? To the local park?
To sports or music practice? When you are going on vacation?

These sorts of questions will orient the teacher to the students’ perspectives and potential interests in maps, which will inform the lessons and thus add personal relevance for the students.

The other thing that can assist teachers in designing meaningful maths lessons is knowledge about how the specific mathematics skills being developed in the classroom are commonly used in the adult world. For instance, on the topic of maps, 20 “plain folks” were interviewed to determine the purposes for which they use them (Griffin, 1995, p. 71). According to these interviews, some of the purposes for which people use maps are (as cited in Griffin, 1995, p. 71):

- Route planning:
 - * Planning several routes and selecting among alternative routes to unfamiliar destinations
 - * Planning routes to circumnavigate cities
 - * Finding a quicker route to a familiar destination
 - * Estimating time and distance to travel the route

- Locating-finding unfamiliar locales, places in the news, and interesting places to visit
- Monitoring progress:
 - * Determining the distance remaining to travel
 - * Confirming that one is still on the right track
- Miscellaneous
 - * Looking at maps out of interest or curiosity
 - * Dreaming about future travel
 - * Collecting maps as a hobby

When teachers have this kind of understanding about student interest and common map usages they can use it to inform their lessons and make the learning experiences applicable to the everyday world.

Ideas for meaningful lessons

When developing map skills with Stage 3 students, a lesson using the local page from the street directory can be meaningful, as I observed with the Year 6 class. For a focus on route planning, using the school as a starting point, lessons could be designed in which students could:

- map out a route from their school to a designated destination point that, in reality, they may actually travel
- be given an average bike riding speed then asked to calculate how long it will take to bike the route they've chosen from school to the destination point
- map out the route commonly taken by the school bus or their parents as they're driven home. Given an average driving speed, they could calculate how long the route should take. Then, when they actually ride home that day, they could time their journey, compare their calculation using the map to the reality and pose some explanations for the results.
- map out a different school-to-home route to what they normally take. Next, according to their usual means of transport (foot, bike, car or bus), they could calculate the time this route should take. Then timing themselves, they could actually take the alternative route and reflect on the results, considering any unforeseen factors such as areas of heavy traffic or steep hills ¹
- use the same steps to compare routes but this time using two routes they map out in their neighbourhood that have the same start and finish points

These are the kinds of mathematics lessons that can relate and be applicable to the students' lives outside of school, and thus be truly meaningful, motivating and engaging.

References

- Board of Studies NSW. (2002). *Mathematics K–6 Syllabus*. Sydney: Author.
- Brenner, M. (1998). Meaning and money. *Educational Studies in Mathematics*, 36(2), 123–155.
- Griffin, M. (1995). You can't get there from here: situated learning, transfer and map skills. *Contemporary Educational Psychology*, 20, 65–87.
- Vale, C. (1999). *Meaningful Mathematics in the Middle Years*. Retrieved June 12, 2007, from <http://www.aare.edu.au/99pap/val99544.htm>

Miranda Pacaya Whittle
(3rd year student)
University of Sydney
<mirandapacaya@gmail.com>

APMC

¹In a study done at the Florida State University School on fourth grade students acquiring map skills, results suggested that the 'situated learning' approach which entailed students actually walking the routes they had mapped out in the classroom, rather than a traditional classroom presentation, was more effective for learning and elicited more positive attitudes from the students (Griffin, 1995, p. 65).